



Metabolic Engineering and EPA's Missions

Metabolic Engineering Workshop
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Off. Pollution Prevention and Toxics



EPA Mission Areas with Potential Metabolic Engineering Interest

- Green Chemistry/Pollution Prevention
- Biotechnology
- Pesticides
- Waste Treatment/Hazardous Waste
- Air Quality



How Metabolic Engineering Fits: Examples From Funded Projects

- **Pollution Prevention/Green Chemistry**
 - METABOLIC ENGINEERING OF SOLVENT TOLERANCE IN ANAEROBIC BACTERIA. (NSF/EPA)
 - METABOLIC ENGINEERING OF METHYLOTROPHIC BACTERIA FOR CONVERSION OF METHANOL TO HIGHER VALUE ADDED PRODUCTS (NSF/EPA)
 - COMBINATORIAL IN VITRO MANIPULATION OF A POLYKETIDE SYNTHASE PATHWAY ON A MICROSCALE (NSF)
 - METABOLIC ENGINEERING OF BACILLUS FOR ENHANCED PRODUCT YIELD (NSF/EPA)
 - LABORATORY EVOLUTION OF CAROTENOID BIOSYNTHETIC PATHWAYS (NSF)
 - METABOLIC ENGINEERING OF ISOPRENOID PRODUCTION (NSF/ONR)
 - METABOLIC ENGINEERING OF SUCCINATE PRODUCTION IN ACTINOBACILLUS SUCCINOGENES (NSF)



How Metabolic Engineering Fits: More Examples

● Biotechnology

- MATHEMATICAL AND COMPUTATIONAL ANALYSIS OF CENTRAL CARBON PATHWAYS FOR EFFICIENT METABOLIC ENGINEERING (DOE/NASA)
- A FUNCTIONAL PROTEOMICS APPROACH FOR ELUCIDATION OF METABOLIC PATHWAYS: AROMATIC BIOSYNTHESIS IN ARCHAEoglobus FULGIDUS (NIST/NSF)
- IN SILICO ANALYSIS OF THE ESCHERICHIA COLI METABOLIC GENOTYPE AND THE CONSTRUCTION OF SELECTED ISOGENIC STRAINS (NSF/ONR)
- MODELING METABOLIC PATHWAYS: A BIOINFORMATICS APPROACH (NSF/ONR/DOE)
- DEVELOPMENT OF THE METACYC METABOLIC DATA BASE (NIH)
- A COMPUTATIONAL FRAMEWORK FOR THE DISCOVERY OF NOVEL BIOTRANSFORMATIONS (DOE)



How Metabolic Engineering Fits: More Examples

● Hazardous Waste

- STRATEGIES FOR METABOLIC ENGINEERING OF ENVIRONMENTAL MICROORGANISMS - APPLICATION TO DEGRADATION OF ORGANOPHOSPHATE CONTAMINANTS (NSF/ONR)

● Pesticides

- ANALYSIS AND MANAGEMENT OF FLUXES IN BACILLUS PATHWAYS FOR PESTICIDE AND PROTEIN PRODUCTION (EPA)

● Air Quality

- ADVANCED ETHANOLOGENIC BIOCATALYSTS FOR LIGNOCELLULOSIC FERMENTATIONS (USDA,DOE)
- MAXIMIZING ETHANOL PRODUCTION BY ENGINEERED PENTOSE-FERMENTING ZYMOMONAS MOBILIS (USDA,DOE)